pulse doubler

026

T. Giesberts

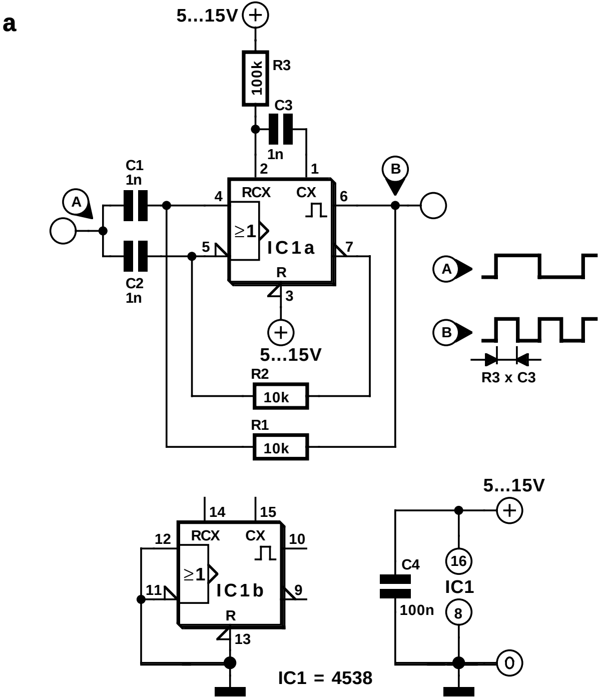
The design of frequency and pulse doubling circuits is normally complex and critical. The circuit in Figure 1a is a pleasant exception to this. It is based on a standard monostable multivibrator (MMV) and produces an output pulse for both the leading and the trailing edge of the input pulse. The duration of the output pulses is determined by the time constant R_3-C_3.

The TTL input signal is linked to both the +T (positive pulse) and the –T (negative pulse) inputs IC_{1a} via capacitors C_1 and C_2 respectively. The two inputs cannot be active simultaneously. This means that at the leading edge of the input pulse, the negative input must be high, and at the trailing edge, the positive input must be low.

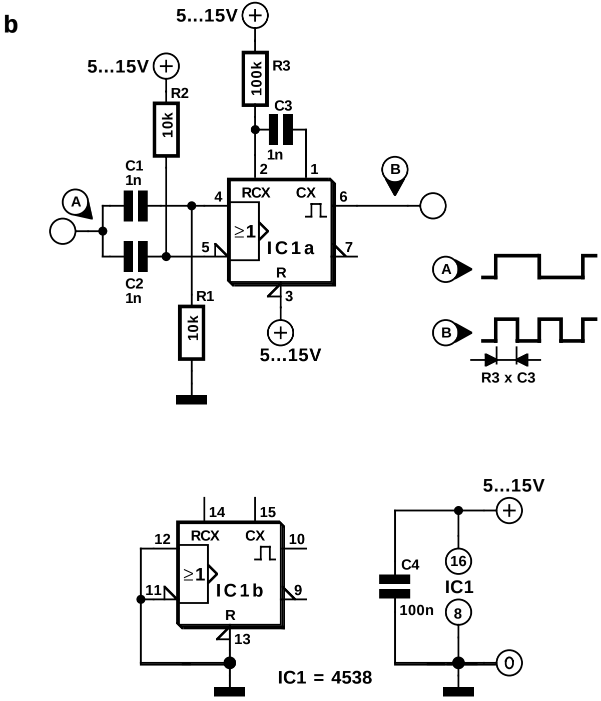
Since IC_{1a} is a retriggerable MMV, each output pulse is stretched by the time constant R_3-C_3. The linking of both outputs with the relevant input via resistor R_1 and R_2 respectively ensures that a quiescent trigger input is at a non-active level. But, because the other trigger input is then at an active level for the duration of the pulse, the design ensures that the MMV is not retriggerable. If the width of the input pulse is shorter than the width of the output pulse (determined by R_3-C_3), only one output pulse will be produced, since the MMV can be retriggered only when the output pulse has terminated. It should therefore be ensured that the time constants R_1-C_1 and R_2-C_2 are shorter than R_3-C_3 at all times.

If a retriggerable version of the circuit is desired, the design shown in Figure 1b may be used. Again, the input signal is applied to the two trigger inputs via capacitors. In this case, however, resistors R_1 and R_2 are linked directly to the supply voltage to make the inputs inactive. This results in the outputs being active as soon as the duration of the input signal is shorter than that of the output pulse. No output pulses are produced then, of course.

[994061]



994061 - 11



994061 - 12